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DES MOINES, IA 50309-2350

EXAMINER	
CYGAN, MICHAEL T	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 22

Application Number: 09/819,943
Filing Date: March 28, 2001
Appellant(s): SNELLING ET AL.

Donald H. Zarley
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 05 May 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-3 and 9-17 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

3,485,100	PETERSEN	1-1968
3,461,446	SERGEANT	7-1965
5,719,332	WALLRAFEN	02-1998

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 9-11, and 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Petersen (US 3,485,100). Petersen discloses the claimed invention, a detector assembly [5] including a thermally conductive substrate [30] on which is mounted a heater [33] and an elongated temperature-dependent resistance sensor [34] in such a way that the heater adds heat to the vessel and the sensor element responds to temperatures at discrete vertical elevations of the vessel; see Figures 1 and 5; column 4, lines 29-38. An analog processor electrically connected to the sensor receives the temperature signal and generating a level signal with the help of liquid level measuring equipment; see column 3, line 72 through column 4, line 5. The level is interfaced electrically to indicator means; see column 1, lines 27-32. A power source [14] is electrically connected to the level measuring apparatus and measurement circuit. The temperature signal is proportional to the magnitude of the resistance; see column 3, lines 19-66. Upper and lower temperature-dependent resistance sensors [26,29] can be used to surround an elongated temperature-dependent resistance sensor [27 or 28]. The sensor measures electromotive force of the current supplied by the power source

[14] across a resistor [34] and is therefore a potentiometer. Petersen additionally discloses the method of providing the substrate, mounting the heater and sensor upon it, and electrically connecting the components; see entire document, particularly column 3, line 72 through column 4, line 5.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen (US 3,485,100) in view of Sergeant (US 3,461,446). Petersen teaches the claimed invention except for positioning the lower end of the sensor above the lower inner surface of the vessel by a vertical clearance such that the processor interprets the elevation signal to be relative to the lower inner surface of the vessel. Sergeant teaches a temperature resistance liquid level sensor which is mounted at a predetermined point above the bottom of the chamber and provides a signal when the liquid level, i.e., the elevation of the surface relative to the bottom of the vessel, reaches that point; see column 2, lines 1-39. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a mounting at a predetermined point above the bottom of the chamber as taught by Sergeant in the invention taught by Petersen to mount the sensor such that a signal can be sensed when liquid level reaches a certain vertical point, since both Sergeant and Petersen teach triggering of a fill valve when liquid is desired to reach a certain height and the orientation of Sergeant provides a vertical point of reference which would be useful in setting a triggering point in the invention of Petersen.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen (US 3,485,100) in view of Wallrafen (US 5,719,332). Petersen teaches the claimed invention except for microprocessor control. Wallrafen teaches the use of microprocessor control of the signals generated by an elongated temperature-resistance liquid level sensor; see Figure 1 and column 4, lines 35-62. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a microprocessor as taught by Wallrafen in the invention taught by Petersen to form the control circuit, since Wallrafen teaches that microprocessors can replace analog control circuitry, and microprocessors provide such advantages as ease of programming and reprogramming and data input/output control.

(11) Response to Argument

Appellant argues (pages 5-7) that Petersen does not disclose a "thermally conductive substrate". In the applied rejection, rod 30 (also shown as element 5) was set forth as a thermally conductive substrate in a manner satisfying the claimed limitations. In arguing against rod 30 being thermally conductive, appellant cites Petersen at column 4 lines 29-38 as stating that the rod 30 is composed of "insulating material". It is known that "insulating" is a term that can refer to either thermal or electric properties. At column 4 line 34, Petersen states that "the heating effect across the rod is very good"; therefore, Petersen clearly states that the rod is not thermally insulating and is on the contrary, a very good thermal conductor. Appellant further argues that Petersen states at column 4 lines 36-38 that "the heat transfer in the longitudinal

direction is correspondingly poor on account of the small cross-sectional area". However, that sentence states that is the small cross-sectional area that is responsible for the poor heat transfer, not any property of the material itself; Petersen is simply stating that the thinness of the rod limits the amount of heat able to cross the thermally conductive rod from point A to point B. Furthermore, it must be noted that even "poor" thermal conductivity of a substrate by the applied reference would anticipate the claim, since the claim merely requires a "thermally conductive substrate". The examiner further notes that the operation of Petersen relies on a thermally conductive rod 30 to transfer heat from a resistor to bring temperature sensitive resistors to a first temperature (which are cooled by contact with a liquid thus resulting in a liquid level determination), and would be inoperative with a thermally insulating rod.

Appellant argues (pages 7-11) that Petersen does not disclose the limitation of appellant's claim 11 of "upper, intermediate, and lower sensors" wherein the intermediate sensor has a "vertical dimension sufficiently large that said temperature signal will vary in proportion to said longitudinal portion of said intermediate sensor thermally coupled to the liquid". The applied rejection set forth Figure 4 showing upper [26], intermediate [27,28], and lower [29] sensors; appellant at page 9 lines 20-25 further states that the sensors of Figure 4 are "the same as the resistors 18-21 in the Figure 3 embodiment" and "the disclosure regarding resistors 18-21 in the FIG. 3 is relevant to the properties of resistors 26-29 of FIG. 4". Appellant counters with the

argument that the sensors 26-29 are not longitudinally sensitive because they are a different embodiment from the longitudinally sensitive sensor 34 of Figure 5.

In discerning the relationship between the Figures, it is helpful to first refer to Figure 1, which is an overview of the apparatus in which "rod-shaped vertical element 5" represents the liquid level measuring equipment (see column 3 lines 10-12). In Figure 2, the rod-shaped vertical element 5 is shown schematically to comprise a heating resistor element 7 and a longitudinally sensing element 8 (see column 3 lines 14-17). In Figure 5, the actual construction of such an element 5 is set forth, detailing the use of a layer of heating resistor material 33 and a layer of sensing resistor material 34 (see column 4 lines 29-34). These Figures are not meant to represent different embodiments, merely show different degrees of detail (overview, schematic, and material construction) of the invention of Petersen. The sensing element (described alternately as 8 or 34) is longitudinally responsive to liquid level changes as disclosed at column 3, lines 59-71. The difference between Figures 3 or 4 from the Figure 5 (or 1 or 2) is that "the resistor element 8 is replaced by four [or for Figure 4, five] discrete series-connected resistors" which "likewise consist of a temperature-dependent material"; see column 4 lines 4-17. Since the resistors of Figures 3 or 4 are stated to consist of the same longitudinally temperature responsive material as that of Figure 5, no argument can be made that different embodiments of material structure exist which invalidate the use of Figures 3 or 4 to anticipate a claim reciting "upper, intermediate, and lower sensors" wherein the intermediate sensor is made from a material such that "said

temperature signal will vary in proportion to said longitudinal portion of said intermediate sensor thermally coupled to the liquid".

Appellant's related argument portrays the intermediate sensor(s) as not having a sufficiently large vertical dimension such that the temperature signal will vary in proportion to the liquid-coupled portion. However, Figures 3 and 4 both show intermediate sensors having considerable vertical spans. The sensors of Figure 3 are described by Petersen as "likewise" consisting of a temperature-dependent material as that of Figure 2 (and thus of Figure 5). Therefore, sensors 18-21 are simply smaller versions of sensor 8, which would therefore act "likewise" to sensor 8 and produce a temperature signal which will vary in proportion to said longitudinal portion of said intermediate sensor thermally coupled to the liquid. As appellant has equated Figures 3 and 4, sensors 26-29 would act in the same manner, and therefore anticipate the rejected claims. Further evidence of this can be seen in the use of switches (Figure 4) which are used by Petersen to transform the output of the sensors 26-29 (which vary in response to the amount of longitudinal portion coupled to the liquid) to discrete single response signals (in which each individual switch changes state when the sensors achieve a certain amount of thermal liquid coupling). If the sensors 26-29 had no sufficiently large vertical component, then the use of switches would be redundant and unnecessary.

Appellant's final argument (pages 11-12) states that the resistors 26 and 29 of Petersen do not generate respective electrical signals each defining a temperature

signal. However, since each resistor is comprised of temperature-sensitive material, and each resistor produces a signal responsive to the temperature of the resistor (which changes due to thermal coupling with different liquid levels), the resistors clearly generate respective electrical signals each defining the temperature of the resistor. Each of the plural, discrete temperature signals is summed by a measurement circuit acting as a processor to calculate the elevation of the liquid (column 4 lines 13-14). Therefore the claims are anticipated by the reference.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Michael Cygan
Examiner
Art Unit 2855

MTC
October 2, 2003

Conferees

Edward Lefkowitz EL

Olik Chaudhuri OC

ZARLEY LAW FIRM, P.L.C.
CAPITAL SQUARE
400 LOCUST, SUITE 200
DES MOINES, IA 50309-2350